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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/137,822	08/21/1998	MICHAEL NAESBY	P1614-8067	3311

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ARENT, FOX KINTNER, PLOTKIN & KAHN
1050 Connecticut Avenue, N.W.
Suite 600
Washington, DC 20036-5339

EXAMINER	
GOLDBERG, JEANINE ANNE	
ART UNIT	**PAPER NUMBER**
1634	

DATE MAILED: 08/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/137,822	NAESBY, MICHAEL	
	Examiner	Art Unit	
	Jeanine A Goldberg	1634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 July 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *33,37-41,44-54,57,59-62,65-68,71 and 73-85* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *82-85* is/are allowed.

6)☒ Claim(s) *33,41,44,46,48-57,62,65-68,71 and 76-81* is/are rejected.

7)☒ Claim(s) *37-40,45,47,59-61 and 73-75* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This action is in response papers filed July 13, 2004.

2. Currently, claims 33, 37-41, 44-54, 57, 59-62, 65-68, 71, 73-85 are pending.

3. This action contains new grounds of rejection (see 102 rejection of Ecker to include Claims 33, 57, 71).

4. The response correctly points out that MPEP 706 encourages identification of issues early in prosecution for Applicant to reply at the earliest opportunity (see page 21 of Response filed July 13, 2004). The response requests clarification as to why the rejections were not made prior to Appeal. Upon review of the pending claims, the claims were read as broadly reasonably possible and an updated search was performed which revealed additional art.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 33, 57, 71 are rejected under 35 U.S.C. 102(b) as being anticipated by Svinarchuk (J Biol Chem 1995 Jun 9;270(23):14068-71).

Svinarchuk teaches triple helix formation in which "the stability of double-stranded DNA is increased by the binding of the third strand"(abstract). Oligonucleotides were synthesized and labeled (Pg 14068, Col 2, Para 2). The triple helix was formed and monitored by 5% polyacrylamide gel electrophoresis (Pg 14068, Col 2, Para 2). The thermostability was monitored by a thermometer (Pg 14068, Col 2, Para 2). As seen in Figure 3, there is only one nucleic acid binding probe C in the triple stranded region, nucleic acid binding probe B is smaller than nucleic acid binding probe C, nucleic acid binding probe C has a length of at least 6, nucleic acid binding probe B is capable of having either an asymmetrical or a symmetrical base sequence, nucleic acid binding probe B is bound to nucleic acid A via Hoogsteen base pairing while nucleic acid binding probe C is bound to nucleic acid A via Watson and Crick binding, and nucleic acid binding probe C fully spans the region of nucleic acid binding probe B.

It is noted that Svinarchuk teaches a double stranded molecule with a probe hybridized to a specific region. However, as written, the independent claims do not include specific size requirements for nucleic acid binding probe C. Therefore teachings of a double stranded molecule encompass the limitations of the claims. Furthermore, Svinarchuk teaches radiolabeling oligonucleotides and detecting (monitoring) by gel electrophoresis. Thus, Svinarchuk teaches detection of the triplex formation.

With respect to Claim 33, the nucleic acid A binding probe B comprises a binding probe region of 4-10 bases. Comprising is open claim language which allows additional binding bases. Thus, the binding region of 11 bases comprises 4-10 bases.

Response to Arguments

The response traverses the rejection. The response asserts that the amended claims can only be interpreted to mean that the binding probe B must include a binding region of 4-10 bases and may include some additional feature. The response (page 23) asserts that the language does not mean or imply that an 11 base binding region is encompassed by a limitation claiming "a binding region of 4-10 bases." This argument has been reviewed but is not convincing. The transitional term "comprising", which is synonymous with "including," "containing," or "characterized by," is inclusive or open-ended and does not exclude additional, unrecited elements or method steps. See, e.g., Genentech, Inc. v. Chiron Corp., 112 F.3d 495, 501, 42 USPQ2d 1608, 1613 (Fed. Cir. 1997) ("Comprising" is a term of art used in claim language which means that the named elements are essential, but other elements may be added and still form a construct within the scope of the claim.) Thus the limitation "binding probe B comprises a binding region of 4 to 10 bases" does not limit the binding region to 4 to 10 bases. The binding region comprises 4 to 10 bases, thus, the binding region encompasses 4 to an unspecified number of bases. The claim may be amended to conform with applicant's arguments if the binding region consists of 4 to 10 bases. However, as written, the claim must be interpreted as broadly as possible. Since applicants argue that the binding region may include some additional features (page 23 of response),

these additional features do not exclude additional bases of binding regions. Thus for the reasons above and those already of record, the rejection is maintained.

6. Claims 33, 41, 44, 48-54, 57, 62, 65-68, 71, 76-81 are rejected under 35 U.S.C. 102(b) as being anticipated by Ecker et al. (US Pat. 5,641,625, June 1997).

Ecker et al. (herein referred to as Ecker) teaches a method of using double-stranded DNA with peptide nucleic acids. PNA and analogues are used to form triplex structures. Ecker teaches that PNA compounds are able to form triple helices with dsDNA (limitations of Claim 77-79). The triplexes, eg., PNA2/DNA surprisingly have very high thermal stability (col. 4, lines 30-35). With respect to Claim 44, 53-54, 67-68, 80-81 nucleic acid is more stable than its DNA equivalent (col. 4, lines 30-35). By introducing PNA, the probe has been chemically modified to destabilize triple helix formation with two probe B's or two probes C. Figure 4 shows a PAGE autoradiograph demonstrating the PNAs-T10 bind to double-stranded DNA with high sequence specificity (limitations of Claim 48, 49, 65-66). As seen in Figure 6, for example, a graph based on densitometric scanning of PAGE autoradiographs demonstrating the kinetics of the binding of PNA-T10 to a double stranded target. Ecker teaches the preferred PNA compound (col. 5-8)(limitations of Claim 50-52). Ecker also teaches using binding probe B with only pyrimidine (C/T bases) and a binding probe C with at least one non-pyrimidine base (A/G base). As seen in Figure 5, the triplex comprises a PNA –T10 probe (only pyrimidine bases) and binding probe C comprises at least one A or G (limitations of Claim 41, 62, 76).

With respect to Claim 33, 57, 71, the nucleic acid A binding probe B comprises a binding probe region of 4-10 bases. Ecker teaches a binding region of 10 bases. Each of the PNA probes are 10 nucleotides in length.

Therefore, Ecker teaches a triplex structure of nucleic acids which meets the limitations of the instant claims.

Response to Arguments

The response traverses the rejection. The response asserts that Ecker does not readily reveal the limitation of nucleic acid A binding probe B comprises a binding region of 4 to 10 bases. This argument has been reviewed but is not convincing because, while the previous rejection did not include claims 33, 57, 71, this appears to be a clear oversight since the PNA probe is 10 bases in length, thus comprising a binding region of between 4-10 bases. Ecker teaches a nucleic acid binding probe B which is 10 nucleotide sin length. Thus for the reasons above and those already of record, the rejection is maintained.

7. Claims 33, 44, 46, 48-49, 53-54, 57, 65-68, 78-81 are rejected under 35 U.S.C. 102(e) as being anticipated by Carlsson et al. (US Pat. 6,020,1269

Carlsson teaches a method of detecting a single base pair mismatches (i.e. a difference) relative to a defined sequence using a PNA probe which hybridizes with DNA to form complexes having higher thermal stability, but greater sensitivity to base pair mismatches, then corresponding DNA/DNA complexes (abstract). Carlsson teaches that a 15-mer peptide nucleic acid (PNA probe can distinguish normal and mutant sequences in double-stranded DNA from the cystic fibrosis gene (col. 4, lines

40-45). With respect to Claim 44, 53-54, 67-68, 80-81 nucleic acid is more stable than its DNA equivalent

With respect to Claim 33, 57, the nucleic acid A binding probe B comprises a binding probe region of 4-10 bases. Comprising is open claim language which allows additional binding bases. Thus, the binding region of 15 bases comprises 4-10 bases.

Therefore, Carlsson teaches a triplex structure of nucleic acids which meets the limitations of the instant claims.

Response to Arguments

The response traverses the rejection. The response asserts that the amended claims can only be interpreted to mean that the binding probe B must include a binding region of 4-10 bases and may include some additional feature. The response (page 23) asserts that the language does not mean or imply that an 11 base binding region is encompassed by a limitation claiming "a binding region of 4-10 bases." This argument has been reviewed but is not convincing. The transitional term "comprising", which is synonymous with "including," "containing," or "characterized by," is inclusive or open-ended and does not exclude additional, unrecited elements or method steps. See, e.g., Genentech, Inc. v. Chiron Corp., 112 F.3d 495, 501, 42 USPQ2d 1608, 1613 (Fed. Cir. 1997) ("Comprising" is a term of art used in claim language which means that the named elements are essential, but other elements may be added and still form a construct within the scope of the claim.) Thus the limitation "binding probe B comprises a binding region of 4 to 10 bases" does not limit the binding region to 4 to 10 bases. The binding region comprises 4 to 10 bases, thus, the binding region encompasses 4 to

an unspecified number of bases. The claim may be amended to conform with applicant's arguments if the binding region consists of 4 to 10 bases. However, as written, the claim must be interpreted as broadly as possible. Since applicants argue that the binding region may include some additional features (page 23 of response), these additional features do not exclude additional bases of binding regions. Thus for the reasons above and those already of record, the rejection is maintained.

Allowable Subject Matter

8. Claims 37-40, 45, 47, 59-61, 73-75 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. Claims 82-85 are allowable.

10. Dervan et al. (US Pat. 6,403,302, June 11, 2002) is the closest prior art. Dervan et al. (herein referred to as Dervan) teaches methods and compositions for triple helix formation. As seen in Figure 26, the double stranded target is detected using probes 3 and 4. Probes 3 and 4 each are complementary to the first strand of nucleic acid. Probes 3 and 4 are each 9 nucleotides in length and are complementary to adjacent regions of the first strand of the nucleic acid. Moreover, as seen in Figure 36, the ribbon model depicts nine-mer oligonucleotides binding to adjacent triple helix binding sites (col. 11, lines 60-68). Each of the depicted probes appear to hybridize to the 3'-5' strand of nucleic acid. Figure 36, right figure, contains crossover between strands, such that no linker between binding domains is necessary. However, Figure 36, left figure

uses a linker domain for successfully crossing the major groove (col. 43-44). Dervan teaches a method of using both probe 3 and 4 in combination (col. 42, lines 29-35).

The binding probe B comprises a binding region of 4-10 bases. Since the claim provides that the binding region comprises the 4-10 bases, the binding region is not limited to 4-10 bases. As seen in Figure 36 and 26, the figure illustrates a triple stranded complex which comprises 2 different binding probe C's. Figure 36, right illustrates a non-overlapping region. Figure 36, right illustrates a non-overlapping region which is juxtaposed. The triple stranded complex is at least 6 bases in length, namely 18. Each of the probes contribute 9 base pairs, which is between 1-11 nucleotides.

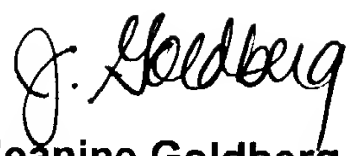
Devan does not teach "the binding region of C is longer as compared with the binding region of probe B." Thus, Devan does not teach nor suggest the limitations of Claim 37.

Conclusion.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Jeanine Goldberg whose telephone number is (571) 272-0743. The examiner can normally be reached Monday-Friday from 7:00 a.m. to 4:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion, can be reached on (571) 272-0782.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jeanine Goldberg
Patent Examiner
August 5, 2004